

Musculoskeletal pain in four occupational populations in Sri Lanka

S. S. P. Warnakulasuriya¹, R. J. Peiris-John^{2,3}, D. Coggon⁴, G. Ntani⁴, N. Sathiakumar⁵ and A. R. Wickremasinghe⁶

¹Department of Medical Education and Health Sciences, Faculty of Medical Sciences, University of Sri Jayewardenepura, Nugegoda, Sri Lanka, ²Department of Physiology, Faculty of Medical Sciences, University of Sri Jayewardenepura, Nugegoda, Sri Lanka, ³Section of Epidemiology and Biostatistics, School of Population Health, Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand, ⁴MRC Lifecourse Epidemiology Unit, University of Southampton, Southampton, UK, ⁵Department of Epidemiology, School of Public Health, University of Alabama at Birmingham, Birmingham, AL, USA, ⁶Faculty of Medicine, University of Kelaniya, Kelaniya, Sri Lanka.

Correspondence to: D. Coggon, MRC Lifecourse Epidemiology Unit, Southampton General Hospital, Southampton SO16 6YD, UK. Tel: +44 (0)2380 777624; fax: +44 (0)2380 704021; e-mail: dnc@mrc.soton.ac.uk

Background	Factors influencing work-related musculoskeletal disorders might differ in developing and developed countries.
Aims	To assess the prevalence and determinants of musculoskeletal pain in four occupational populations in Sri Lanka.
Methods	As part of the international Cultural and Psychosocial Influences on Disability study, samples of postal workers, sewing machinists, nurses and computer operators were interviewed about pain at each of six anatomical sites in the past month, and about possible physical and psychosocial risk factors. Associations with prevalent pain were assessed by binomial regression.
Results	Analysis was based on 852 participants (86% response rate). Overall, the lower back was the most common site of pain, with 1-month prevalence ranging from 12% in computer operators to 30% in nurses. Postal workers had the highest prevalence of shoulder pain (23%), but pain in the wrist/hand was relatively uncommon in all four occupational groups (prevalence rates ranged from 8% to 9%). Low mood and tendency to somatize were consistently associated with pain at all six sites. After adjustment for psychosocial risk factors, there was a higher rate of low back pain in nurses and postal workers than in computer operators, a higher rate of shoulder pain in postal workers than in the other occupational populations, and a relatively low rate of knee pain in computer operators.
Conclusions	Rates of regional pain, especially at the wrist/hand, were lower than have been reported in Western countries. As elsewhere, pain was strongly associated with low mood and somatizing tendency. Differences in patterns of pain by occupation may reflect differences in physical activities.
Key words	Elbow; knee; low back; low mood; neck; psychosocial; risk factor; shoulder; somatizing tendency; wrist.

Introduction

Musculoskeletal disorders are an important cause of morbidity and disability in developed countries, where they have been linked with occupational physical activities and with low mood and tendency to somatize [1–5]. However, their prevalence in developing countries can be much lower [6], and it is unclear whether in these circumstances the impact and relative importance of physical and psychosocial risk factors differ.

As part of the international CUPID (Cultural and Psychosocial Influences on Disability) study, we surveyed

four occupational groups in Colombo, Sri Lanka, to assess the prevalence of musculoskeletal complaints and their associations with risk factors.

Methods

We studied postal workers from the Central Mail Exchange, sewing machinists from two garment factories, nurses from two hospitals and computer operators from six companies. Subjects were identified by random sampling from employment records. Those who agreed

were interviewed by S.S.P.W. using a Sinhala translation of the English language CUPID questionnaire [4,7], which had been previously checked by independent back-translation.

The questionnaire asked about demographic variables; occupation, including working hours and activities in an average working day; time pressure at work; job satisfaction; mental health; tendency to somatize; pain at each of six anatomical sites (low back, neck, shoulder, elbow, wrist/hand and knee) in the past month; and associated disability for everyday tasks. The questions on mental health were derived from the short form 36 health survey (SF-36) questionnaire [8], and scores were classified to thirds of the distribution in the study sample. Questions about somatizing tendency were taken from the Brief Symptom Inventory [9], and subjects were classed according to how many of five symptoms (faintness or dizziness, pains in the heart or chest, nausea or upset stomach, trouble getting breath and hot or cold spells) had been at least moderately distressing in the past week. Pain was classed as disabling if it had made it difficult or impossible to carry out one or more of a specified list of daily activities.

Statistical analysis was carried out with STATA version 11 software. Associations of pain with risk factors were explored by binomial regression and summarized by prevalence rate ratios with associated 95% confidence intervals.

Ethical approval was provided by the Ethical Review Committee of the Faculty of Medical Sciences, University of Sri Jayewardenepura.

Results

Interviews were completed by 858 subjects (86%), but 6 were excluded because they had worked in their job for less than a year or were older than 59 years. The remaining 852 participants comprised 250 male postal workers, 213 female sewing machinists, 236 female nurses and 153 computer operators (110 male), with ages from 16 to 59 years (median = 31 years). All of the computer operators used a keyboard for 4 hours per day, while the other occupational groups frequently reported other tasks entailing repeated movement of the wrist or fingers. Working with the hands above shoulder height was reported by almost all postal workers but was much less common in the other groups. Occupational lifting was reported most frequently by the nurses (37%). All of the occupational groups indicated high rates of job satisfaction.

Table 1 shows the 1-month prevalence of pain and associated disability by anatomical site. In three of the occupational groups, the low back was the most commonly reported site of pain, the highest prevalence being in nurses (30%). However, among computer operators, the prevalence of low back pain (LBP) was only 12% and was exceeded by that of neck pain (16%). Postal workers had the highest prevalence of shoulder pain (23%), but pain in the wrist/hand was relatively uncommon in all four occupational groups (prevalence rates ranged from 8% to 9%). Where pain was reported, it was usually disabling for at least one activity.

Table 1. One-month prevalence of pain and associated disability by anatomical site

Anatomical site	Postal workers (<i>n</i> = 250)			Sewing machinists (<i>n</i> = 213)			Nurses (<i>n</i> = 236)			Computer operators (<i>n</i> = 153)		
	<i>n</i>	Prevalence (%)	95% CI	<i>n</i>	Prevalence (%)	95% CI	<i>n</i>	Prevalence (%)	95% CI	<i>n</i>	Prevalence (%)	95% CI
Any pain												
Low back	61	24	19–30	40	19	14–25	70	30	24–36	19	12	8–19
Neck	32	13	9–18	29	14	9–19	29	12	8–17	25	16	11–23
Shoulder	57	23	18–29	33	15	11–21	24	10	7–15	19	12	8–19
Elbow	18	7	4–11	15	7	4–11	4	2	0–4	10	7	3–12
Wrist/hand	22	9	6–13	16	8	4–12	21	9	6–13	13	8	5–14
Knee	45	18	13–23	33	15	11–21	56	24	18–30	13	8	5–14
Disabling pain												
Low back	44	18	13–23	29	14	9–19	52	22	17–28	11	7	4–12
Neck	15	6	3–10	21	10	6–15	22	9	6–14	15	10	6–16
Shoulder	36	14	10–19	26	12	8–17	20	8	5–13	14	9	5–15
Elbow	11	4	2–8	12	6	3–10	3	1	0–4	9	6	3–11
Wrist/hand	18	7	4–11	14	7	4–11	19	8	5–12	10	7	3–12
Knee	41	16	12–22	32	15	11–21	50	21	16–27	11	7	4–12

CI, confidence interval.

Table 2. Associations of pain in past month with psychosocial risk factors and occupation

Risk factor	LBP		Neck pain		Shoulder pain		Elbow pain		Wrist/hand pain		Knee pain	
	<i>n</i> ^a	PRR ^b (95% CI)	<i>n</i> ^a	PRR ^b (95% CI)	<i>n</i> ^a	PRR ^b (95% CI)	<i>n</i> ^a	PRR ^b (95% CI)	<i>n</i> ^a	PRR ^b (95% CI)	<i>n</i> ^a	PRR ^b (95% CI)
Mental health												
Good	49	1	32	1	37	1	10	1	19	1	44	1
Intermediate	61	1.3 (0.9–1.8)	40	1.2 (0.8–1.9)	35	1.1 (0.7–1.7)	12	1.4 (0.6–3.2)	23	1.2 (0.7–2.2)	43	1.1 (0.7–1.6)
Poor	80	1.7 (1.2–2.3)	43	1.2 (0.8–1.9)	61	1.7 (1.1–2.4)	25	2.6 (1.2–5.3)	30	1.5 (0.8–2.6)	60	1.5 (1.0–2.1)
Number of distressing somatic symptoms												
0	115	1	62	1	72	1	27	1	38	1	90	1
1	40	1.1 (0.8–1.5)	31	1.7 (1.2–2.6)	36	1.8 (1.3–2.5)	12	1.4 (0.7–2.7)	16	1.4 (0.8–2.4)	23	0.8 (0.5–1.2)
≥2	35	1.3 (0.9–1.8)	22	2.0 (1.3–3.2)	25	2.0 (1.3–2.9)	8	1.6 (0.7–3.4)	18	2.4 (1.4–4.2)	34	1.8 (1.3–2.6)
Hours worked per week												
35–49	53	1	33	1	42	1	19	1	22	1	52	1
50–59	49	1.3 (1.0–1.8)	29	1.3 (0.9–2.1)	17	0.7 (0.4–1.2)	8	0.7 (0.3–1.5)	13	1.0 (0.5–1.9)	27	0.8 (0.5–1.2)
≥60	88	0.9 (0.7–1.2)	53	0.9 (0.6–1.4)	74	1.0 (0.7–1.3)	20	0.5 (0.3–1.0)	37	1.1 (0.6–1.8)	68	0.7 (0.5–1.0)
Time pressure at work												
No	67	1	45	1	54	1	22	1	27	1	57	1
Yes	123	1.4 (1.1–1.8)	70	1.3 (0.9–1.8)	79	1.3 (1.0–1.8)	25	0.9 (0.5–1.6)	45	1.3 (0.8–2.1)	90	1.1 (0.8–1.6)
Main occupation												
Computer operator	19	1	25	1	19	1	10	1	13	1	13	1
Postal worker	61	2.0 (1.1–3.7)	32	0.8 (0.4–1.6)	57	1.9 (0.9–3.9)	18	0.8 (0.3–2.2)	22	1.7 (0.6–5.1)	45	1.4 (0.7–2.9)
Sewing machinist	40	2.8 (0.9–8.5)	29	1.6 (0.6–4.4)	33	0.8 (0.4–1.5)	15	1.1 (0.3–3.7)	16	0.4 (0.2–0.9)	33	7.5 (1.1–52.6)
Nursing officer	70	4.1 (1.4–12.5)	29	1.2 (0.4–3.2)	24	0.4 (0.2–0.8)	4	0.2 (0.1–1.1)	21	0.5 (0.2–1.0)	56	9.7 (1.4–67.7)

PRR, prevalence rate ratio.

^aNumber of cases (one subject was excluded from analysis because of missing data on somatizing tendency).

^bPrevalence rate ratio adjusted for all risk factors in table and also for sex and age (16–29, 30–39, 40–49 or 50–59 years).

Table 2 summarizes the associations of risk factors with pain at different anatomical sites. Low mood and tendency to somatize were consistently associated with pain at all six sites, with a gradation of risk across levels of these risk factors. LBP and shoulder pain were also associated with reported time pressure at work, but there were no consistent associations with working hours. After adjustment for other risk factors, the higher risk of LBP in postal workers and nurses compared with computer operators was confirmed, as was a relatively high rate of shoulder pain in postal workers and a relatively low rate of knee pain in computer operators.

Discussion

In the four Sri Lankan occupational groups studied, regional pain was generally less frequent than has been reported in Western countries [4,6,7]. In particular, the 1-month prevalence of wrist/hand pain in computer operators (8%) was substantially lower than that reported among office workers carrying out similar tasks in the UK (30%) [6]. However, for knee pain, the differences were

smaller—8, 15, 18 and 24%—in the four occupational groups compared with 18–19% for similar occupations in Greece [4] and 22% in New Zealand [7]. This suggests that the disparity does not simply reflect differences in the understanding of pain. One possible explanation is that the variations in prevalence are driven, at least in part, by culturally determined differences in health beliefs and expectations [10].

Despite the lower prevalence of musculoskeletal symptoms in Sri Lanka, as elsewhere [2–6], they were strongly associated with psychosocial risk factors—in particular, low mood and somatizing tendency. While mood could be lowered as a consequence of pain, longitudinal studies have indicated that both low mood and somatizing tendency predict the future incidence and persistence of regional pain [2,3].

The observed differences in patterns of pain between occupational groups may reflect differences in occupational activities, but our findings reinforce the importance also of psychological influences on musculoskeletal pain. Moreover, if health beliefs drive the large differences in prevalence between countries, overemphasis on

protection from harmful physical exposures could have unintended adverse consequences. It may be better, therefore, if ergonomic improvements are presented as a way of making work more pleasant and efficient rather than protecting from injury.

Key points

- Rates of regional pain, especially at the wrist/hand, were lower among Sri Lankan workers than have been reported in Western countries.
- As in developed countries, pain was strongly associated with low mood and somatizing tendency.
- Preventive strategies for work-related musculoskeletal disorders in Sri Lanka should take account of psychological and physical risk factors.

Funding

International Training and Research in Environmental and Occupational Health (ITREOH) Program of the University of Alabama at Birmingham (5 D43 TWO5750 from the National Institutes of Health and the Fogarty International Center (NIH-FIC)).

Conflicts of interest

None declared.

References

1. Lötters F, Burdorf A, Kuiper J, Miedama H. Model for the work-relatedness of low-back pain. *Scand J Work Environ Health* 2003;**29**:431–440.
2. Macfarlane GJ, Hunt IM, Silman AJ. Role of mechanical and psychosocial factors in the onset of forearm pain: prospective population based study. *Br Med J* 2000;**321**:676–679.
3. Palmer KT, Reading I, Linaker C, Calnan M, Coggon D. Population-based cohort study of incident and persistent arm pain: role of mental health, self-rated health and health beliefs. *Pain* 2008;**136**:30–37.
4. Solidaki E, Chatzi L, Bitsios P *et al.* Work related and psychological determinants of multi-site musculoskeletal pain. *Scand J Work Environ Health* 2010;**36**:54–61.
5. Matsudaira K, Palmer KT, Reading I, Hirai M, Yoshimura N, Coggon D. Prevalence and correlates of regional pain and associated disability in Japanese workers. *Occup Environ Med* 2011;**68**:191–196.
6. Madan I, Reading I, Palmer KT, Coggon D. Cultural differences in musculoskeletal symptoms and disability. *Int J Epidemiol* 2008;**37**:1181–1189.
7. Harcombe H, McBride D, Derrett S, Gray A. Physical and psychosocial risk factors for musculoskeletal disorders in New Zealand nurses, postal workers and office workers. *Inj Prev* 2010;**16**:96–100.
8. Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). *Med Care* 1992;**30**:473–483.
9. Derogatis LR, Melisaratos N. The Brief Symptom Inventory: an introductory report. *Psychol Med* 1983;**13**:595–605.
10. Coggon D. Occupational medicine at a turning point. *Occup Environ Med* 2005;**62**:281–283.

EXCELLENCE IN EVIDENCE

OXFORD JOURNALS COLLECTION

Oxford University Press publishes over 200 internationally-acclaimed journals in the areas of:

- Medicine
- Life Sciences
- Mathematics and Physical Sciences
- Law
- Humanities
- Social Sciences

Encourage your institution to subscribe

- **Flexible purchasing**
Subscribe to the whole collection which includes more than 200 titles
- **Advanced online functionality**
Including contents alerting, CiteTrack, RSS, OpenURL, Counter-compliant usage statistics

Pass this information on to your librarian and encourage them to visit
www.oxfordjournals.org/for_librarians

OXFORD
UNIVERSITY PRESS